

Nuclear Power Serves You

[About our plants](#) | [Safety and security are top priorities](#) | [Safe, reliable and low-cost operation](#) | [Need for nuclear power](#) | [Creating the option for new nuclear generation](#) | [How nuclear power plants work](#) | [Environmental stewardship](#) | [Public health and safety](#) | [Safely managing used fuel](#)

Nuclear power has played an important role in FPL's energy mix for more than three decades and provides a safe, clean and reliable source of electricity.

Nuclear energy offers many benefits. It:

- Provides 19 percent of the electricity for our Florida customers and is an important part of our energy mix in the competitive wholesale market in the northeastern and midwestern United States
- Is clean with virtually no emissions, which helps keep the air clean, preserve the Earth's climate, avoid ground-level ozone formation and prevent acid rain, and
- Is efficient and cost-effective because of stable fuel prices, high plant performance and modernized plants.

About our plants

FPL Group owns and operates five nuclear power plants:

- [St. Lucie](#), near Ft. Pierce, Florida
- [Turkey Point](#), near Florida City, Florida
- [Seabrook Station](#), in Seabrook, New Hampshire
- [Duane Arnold Energy Center](#), near Cedar Rapids, Iowa, and
- [Point Beach](#), in Two Creeks, Wisconsin

Safety and security are top priorities

[Safety and security](#) are top priorities at FPL Group's nuclear power plants. Extensive programs ensure that public health and safety is protected through:

- Plant design
- Experienced and well-trained employees
- A comprehensive emergency plan, and
- A strong security program.

Safe, reliable and low-cost operation

FPL Group is dedicated to the safe, reliable operation of its nuclear power plants. That commitment is reflected in the [outstanding safety performance](#) of its plants.

FPL Group's nuclear power plants are also low-cost producers. Uranium fuel prices are stable. That's good news for you because our nuclear power plants can help keep electric bills lower than they might otherwise be if we depended solely on oil and natural gas.

The [Nuclear Energy Institute](#), an industry organization, provides additional information on what experts around the world say about the safety and benefits of nuclear power.

Need for nuclear power

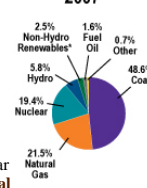
Nuclear energy provides the second largest source of electricity in the United States, providing safe, reliable and low-cost power for homes and businesses.

Some of the reasons that nuclear power remains an attractive source of electricity include

- Growing energy demands
- Unpredictable fossil fuel costs, and
- Continued need for clean energy.

These conditions, in combination with the outstanding performance of FPL's nuclear power plants, were key factors in our company's decisions to pursue [license renewal](#) and [power uprates](#) at our St. Lucie and Turkey Point plants.

**National Fuel Mix
2007**



Creating the option for new nuclear generation

Even with today's available alternative energy supplies and conservation efforts, the need for new power generation in Florida is great. Among other actions, FPL has initiated a process to explore the addition of new nuclear generation to its system. The decision to move forward with a new nuclear power plant will be based on several factors, including the pace of federal and state licensing processes, the capital and operating costs of new nuclear generation and competing alternatives. FPL may not make a decision to build for several years, depending on how these issues unfold. However, it is important that FPL begin working now to [create the option of building a nuclear power plant](#).

How nuclear power plants work

All power plants, including our St. Lucie, Turkey Point, Seabrook, Duane Arnold and Point Beach nuclear power plants, operate in much the same way. Water is heated and turned into steam by using fuel such as coal, natural gas or oil. In a nuclear power plant, however, the fuel is uranium.

Unlike other power plants, however, nuclear power plants do not burn fuel. Instead, the process works this way:

Step	Action
------	--------

1	Tiny parts of the uranium, known as atoms, are made to split, or fission.
2	During fission, even smaller particles of the atom, called neutrons, are released.
3	The neutrons strike more uranium atoms, resulting in the release of heat needed to generate electricity.

There are primarily two kinds of nuclear reactors used to generate electricity in the United States: pressurized water reactors (such as our St. Lucie, Turkey Point, Seabrook and Point Beach plants) and boiling water reactors (such as Duane Arnold).

Pressurized water reactors have three distinct, separate loops of water. In the primary system, shown in red in the schematic above, the uranium fuel heats water through fission. This hot water is pumped into a piece of equipment called a steam generator and circulated through thousands of tubes.

Here, a separate supply of water flows over the hot tubes of reactor water and turns into steam in the secondary system, shown in blue. The steam turns fan-like blades of a turbine, spinning the shaft of an electric generator and producing electricity.

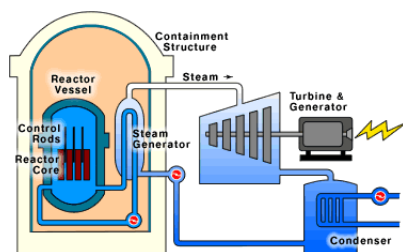
The non-radioactive steam is turned back into water in the condenser by a third system that provides cooling water, shown in purple. Cooling water is circulated through tubes and the steam flows over the tubes, condensing back into water to begin the cycle again. The source of the condenser cooling water at each plant is:

- St. Lucie – the Atlantic Ocean through offshore pipes
- Turkey Point – a closed canal system that acts like a giant radiator to cool the water
- Seabrook Station – the Atlantic Ocean, drawn in through a 17,140-foot tunnel located more than a mile offshore
- Duane Arnold – the Cedar River
- Point Beach - Lake Michigan

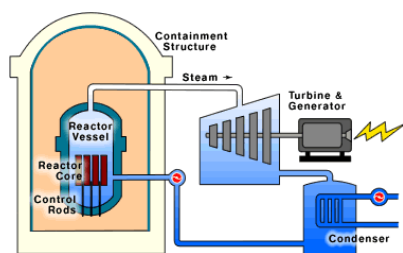
In a boiling water reactor, such as the Duane Arnold Energy Center, heat from nuclear fission boils water in the upper portion of the reactor vessel to form steam, eliminating the need for steam generators. From there, the steam flows to the turbine and turns it to make electricity. The spent steam is condensed back into water for recirculation to the reactor vessel and the process is repeated.

FPL's [E4 Online](#) is an educational and entertaining experience that allows you to explore a virtual visitors' center with four main online rooms and a dozen different interactive exhibits.

[+]
Rate this Page



Pressurized Water Reactor



Boiling water reactor

Environmental stewardship

[Protecting our environment](#) is important, and FPL Group's nuclear power plants provide a clean energy source. Since nuclear power plants do not burn fuel, there are virtually no air emissions, such as greenhouse gases that may contribute to global warming. We also provide for land and wildlife conservation.

At [E4 Online](#) see a preview presentation of [Nuclear Power: Safe for the Environment](#), a video at FPL's Energy Encounter.

Public health and safety

Public health and safety is FPL's top priority in the operation of its nuclear power plants. As a result, we have programs in place that strictly control [radiation](#), and FPL and state agencies conduct extensive monitoring at the plant site and in the surrounding community to ensure that public health and safety is protected.

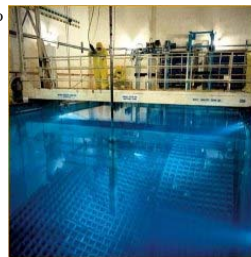
Although FPL's nuclear power plants have a 35-year record of safe, reliable operation, we have a comprehensive [emergency preparedness plan](#) that is routinely tested with federal, state and local emergency management agencies.

Follow this link for more information about the [strict radiation safety standards](#) (PDF 407k) in place at FPL Group's nuclear power plants.

Safely managing used fuel

When the plant's **uranium fuel** no longer contains enough energy to produce electricity efficiently, the used fuel is removed from the reactor. The used fuel is then stored safely in stainless steel-lined concrete pools of water on the plant site. This is called "wet storage."

In 1998, the federal government was to have opened **a permanent repository** for disposal of used fuel from all commercial nuclear power sites. However, the licensing of the disposal site is behind schedule. As a result, FPL Group is supplementing the current wet storage of used fuel with an additional approach using **dry storage containers**. Additional storage is essential so that the plants can continue providing safe, reliable and low-cost electricity to our customers.



Dry storage is not a new practice. It has been in use for more than 20 years and is a proven technology that is **safe, secure, environmentally sound** and much more economical than building another "wet storage" pool.

About one half of the nation's 64 nuclear power plants currently have some form of onsite dry storage (Click here for a map of **dry storage locations**.) In fact, four of FPL Group's nuclear power plants - Duane Arnold in Iowa, Point Beach in Wisconsin, St. Lucie in Florida, and Seabrook in New Hampshire - have been successfully using dry storage. FPL Group's nuclear fleet will use this industry knowledge and best practices throughout the **dry storage process** at its plants.

Follow these links for more information.

- **Safely Managing Used Nuclear Fuel Brochure** (650 KB, **[PDF](#)**)
- Visit FPL's **[E4 Online](#)** to explore the steps involved in used fuel handling by trained nuclear professionals - from wet storage to dry storage, to transportation, and to plans for final disposal. Follow these links for more information: **[E4 Online: used fuel handling](#)** (on the home page click on "Learning Lab").

Copyright ©1996 - 2008, Florida Power & Light Company. All rights reserved.